



## WESTLAND-SIKORSKY S-51...

problems have been (a) the efficiency of the lubrication system with the engine operating horizontally, and (b) the ease of removal from the aircraft for periodic overhaul. These conditions have been met successfully.

The oil sump has been removed from between cylinders 5 and 6, and instead mounted on the rear cover. All the

cylinder heads are inter-connected with drain pipes, and the oil scavenge system has been adapted for efficient draining. An example of this is the supercharger casing, which has been re-designed with a smaller number of diffuser vanes, each incorporating drain holes. The ancillary casing, which carries drives for the vacuum pump, hydraulic pump, r.p.m. generator, starter and oil pump, has also been re-designed to provide all drives with oil-seal protection, and to allow for the running of the gears permanently submerged in oil.

A reversing and reducing gear of 0.8 : 1 is incorporated in the top cover in place of the usual 0.625 or 0.5 : 1 air-screw reduction gear, and the transmission shaft is detachable close to the engine. Air intake to the engine is pressure-fed from below the fan, the entry being situated in such a position that automatic air cleaning is provided. Dirt or other foreign matter is flung outward toward the cowling by centrifugal force so that air entering the intake is always clean.

An innovation in helicopter power-plant installations is provided with the Leonides by the standard inclusion of a Gravinier fire-fighting system. All feed pipes are flexible and fireproof, and the engine fully meets both A.R.B. and M.o.S. requirements in this respect. The mounting of the

engine is of dynafocal type and support pads mounted on the cylinder heads carry the cowling.

The engine compartment is bounded fore and aft by firewalls, on the other sides of which are carried the fuel tanks, each of these providing a capacity of 41.6 Imp. gall. A third firewall immediately forward of the front fuel tank forms the rear bulkhead of the cabin, and above this is arranged a shuttered intake aperture for cooling air. Two further (horizontal) firewalls are arranged, one above the engine at fan level and with a circular aperture for passage of the cooling air, whilst the lower firewall is placed mainly below the exhaust manifold and is so arranged that all engine-driven accessories are beneath it. From the drawing it can be seen that the engine nestles in the heart of a braced structure of welded steel tubes which grow together at the head to form the pylon for the main rotor. Behind the rear fuel tank is the oil tank (8½ Imp. gall), the tail of the braced body structure being given over to baggage stowage. The oil cooler is mounted to port above the engine on the rear of the intermediate firewall.

### Monocoque Undercarriage Struts

In the same lateral plane as the rear fuel tank the main undercarriage projects abeam, and it is of unusual structural form in that the lower members are akin to miniature monocoque "wings." The Turner oleo-pneumatic shock-absorber, which is of Anson type, is carried at the base of the tubular radius strut. Wheels and tyres will be supplied jointly by Dunlops and Goodyears. The nosewheel is carried in a lever-motion fork anchored with its shock-absorber in a cone mounting. This latter is peripherally bolted to the underside of the fuselage, the conic form of the "leg" serving equally to distribute ground-manceuvring and landing loads.

The fuselage nose is given over wholly to the cabin, the glazing and side panelling being carried in a rigid framework supported on the monocoque bath-type structure which forms the floor. From the pilot's seat in the centre of the nose the field of view is so extensive as to give one the feeling almost of nakedness. Indeed, obstruction